

Pipe size *chart* (NPS).

Nominal Pipe Size (NPS) chart for steel pipe — **outside diameter, wall thickness**, and **actual inside diameter** for Schedule 40 and Schedule 80. Spoiler: a '1-inch pipe' isn't 1 inch.

The chart

| NPS | OUTSIDE DIAMETER | SCH 40 WALL | SCH 40 ACTUAL ID | SCH 80 WALL | SCH 80 ACTUAL ID |
|--------|------------------|-------------|------------------|-------------|------------------|
| 1/8" | 0.405" (10.3 mm) | 0.068" wall | 0.269" (6.8 mm) | 0.095" wall | 0.215" (5.5 mm) |
| 1/4" | 0.540" (13.7 mm) | 0.088" wall | 0.364" (9.2 mm) | 0.119" wall | 0.302" (7.7 mm) |
| 3/8" | 0.675" (17.1 mm) | 0.091" wall | 0.493" (12.5 mm) | 0.126" wall | 0.423" (10.7 mm) |
| 1/2" | 0.840" (21.3 mm) | 0.109" wall | 0.622" (15.8 mm) | 0.147" wall | 0.546" (13.9 mm) |
| 3/4" | 1.050" (26.7 mm) | 0.113" wall | 0.824" (20.9 mm) | 0.154" wall | 0.742" (18.8 mm) |
| 1" | 1.315" (33.4 mm) | 0.133" wall | 1.049" (26.6 mm) | 0.179" wall | 0.957" (24.3 mm) |
| 1-1/4" | 1.660" (42.2 mm) | 0.140" wall | 1.380" (35.1 mm) | 0.191" wall | 1.278" (32.5 mm) |
| 1-1/2" | 1.900" (48.3 mm) | 0.145" wall | 1.610" (40.9 mm) | 0.200" wall | 1.500" (38.1 mm) |
| 2" | 2.375" (60.3 mm) | 0.154" wall | 2.067" (52.5 mm) | 0.218" wall | 1.939" (49.3 mm) |
| 2-1/2" | 2.875" (73.0 mm) | 0.203" wall | 2.469" (62.7 mm) | 0.276" wall | 2.323" (59.0 mm) |
| 3" | 3.500" (88.9 mm) | 0.216" wall | 3.068" (77.9 mm) | 0.300" wall | 2.900" (73.7 mm) |

| NPS | OUTSIDE DIAMETER | SCH 40 WALL | SCH 40 ACTUAL ID | SCH 80 WALL | SCH 80 ACTUAL ID |
|-----|--------------------|-------------|--------------------|-------------|--------------------|
| 4" | 4.500" (114.3 mm) | 0.237" wall | 4.026" (102.3 mm) | 0.337" wall | 3.826" (97.2 mm) |
| 6" | 6.625" (168.3 mm) | 0.280" wall | 6.065" (154.1 mm) | 0.432" wall | 5.761" (146.3 mm) |
| 8" | 8.625" (219.1 mm) | 0.322" wall | 7.981" (202.7 mm) | 0.500" wall | 7.625" (193.7 mm) |
| 10" | 10.750" (273.1 mm) | 0.365" wall | 10.020" (254.5 mm) | 0.594" wall | 9.562" (242.9 mm) |
| 12" | 12.750" (323.8 mm) | 0.406" wall | 11.938" (303.2 mm) | 0.688" wall | 11.374" (288.9 mm) |

About NPS. Nominal Pipe Size is a label, not a measurement. The same NPS has the same outside diameter regardless of schedule — the wall thickness changes (and so does the inside diameter). NPS 1/8 through NPS 12 are listed; above 14, the NPS equals the actual OD in inches.

Common applications

| APPLICATION | TYPICAL NPS | SCHEDULE |
|--------------------------------|-------------|------------------------|
| Residential cold water supply | 1/2 or 3/4 | Sch 40 (or PEX/copper) |
| Residential hot water supply | 1/2 | Sch 40 (or PEX/copper) |
| Residential drain (waste) | 1-1/2 or 2 | Sch 40 PVC/ABS |
| Residential sewer main | 3 or 4 | Sch 40 PVC/ABS |
| Natural gas residential | 1/2 or 3/4 | Sch 40 black iron |
| Compressed air shop (~125 psi) | 3/4 or 1 | Sch 40 black iron |

| APPLICATION | TYPICAL NPS | SCHEDULE |
|---------------------------------|-------------|------------------|
| Hydraulic lines (high pressure) | varies | Sch 80 or higher |
| Process piping (industrial) | varies | Per process spec |

Common pitfalls

- **NPS is not a measurement.** A '1-inch pipe' has an OD of 1.315" and (Sch 40) ID of 1.049". Neither equals 1". The number is a historical category, not a dimension.
- **Schedule changes the ID, not the OD.** Threading and fittings work because OD is constant. Higher schedule = thicker wall = smaller ID = more pressure rating but more flow restriction.
- **NPS ≠ NPT.** NPT (National Pipe Taper) is the thread spec. NPS is the pipe size. A '1" NPT thread' lives on a '1" NPS pipe.'
- **Copper tube is different.** Type K/L/M copper uses NPS-like numbering but the actual OD is 1/8" larger than the nominal size (a '1/2" Type L' has 5/8" OD). Don't confuse the two systems.
- **Above NPS 14, the rule changes.** NPS 14 has OD = 14.000" exactly, NPS 16 has OD = 16.000", etc. Below that, look it up.

ISO / DN sizing (metric pipe)

Outside the US, pipe is sized by **Diamètre Nominal (DN)** — the metric equivalent of NPS. DN sizes parallel NPS but use slightly different dimensions. They're conceptually similar but *not* directly interchangeable: DN25 and NPS 1 fittings won't

necessarily mate.

| NPS | DN (ISO) | OD (MM) | OD (IN) | NOTES |
|--------|----------|---------|---------|-----------------------------------|
| 1/8" | DN6 | 10.3 | 0.405" | Smallest standard |
| 1/4" | DN8 | 13.7 | 0.540" | |
| 3/8" | DN10 | 17.1 | 0.675" | |
| 1/2" | DN15 | 21.3 | 0.840" | Common residential gas / hydronic |
| 3/4" | DN20 | 26.7 | 1.050" | Common residential water |
| 1" | DN25 | 33.4 | 1.315" | Common main / branch |
| 1-1/4" | DN32 | 42.2 | 1.660" | |
| 1-1/2" | DN40 | 48.3 | 1.900" | Common drain |
| 2" | DN50 | 60.3 | 2.375" | Standard drain main |
| 2-1/2" | DN65 | 73.0 | 2.875" | |
| 3" | DN80 | 88.9 | 3.500" | Common sewer main |
| 4" | DN100 | 114.3 | 4.500" | Larger sewer / industrial |
| 6" | DN150 | 168.3 | 6.625" | Commercial water main |
| 8" | DN200 | 219.1 | 8.625" | Large commercial / industrial |
| 10" | DN250 | 273.0 | 10.750" | Large industrial |
| 12" | DN300 | 323.9 | 12.750" | Large industrial |

Copper tubing (Type K, L, M)

Copper tubing uses a **different sizing system from NPS**. The OD is 1/8" larger than the nominal size — so "1/2" Type L" copper has OD 5/8", NOT 1/2". Type K is thickest-wall (underground service), Type L is medium (residential interior), Type M is thinnest (interior, low-pressure applications).

| NOMINAL | OD (IN) | OD (MM) | TYPE K WALL | TYPE L WALL | TYPE M WALL |
|---------|---------|---------|-------------|-------------|-------------|
| 1/4" | 0.375" | 9.52 | 0.035" | 0.030" | 0.025" |
| 3/8" | 0.500" | 12.70 | 0.049" | 0.035" | 0.025" |
| 1/2" | 0.625" | 15.88 | 0.049" | 0.040" | 0.028" |
| 5/8" | 0.750" | 19.05 | 0.049" | 0.042" | 0.030" |
| 3/4" | 0.875" | 22.23 | 0.065" | 0.045" | 0.032" |
| 1" | 1.125" | 28.58 | 0.065" | 0.050" | 0.035" |
| 1-1/4" | 1.375" | 34.93 | 0.065" | 0.055" | 0.042" |
| 1-1/2" | 1.625" | 41.28 | 0.072" | 0.060" | 0.049" |
| 2" | 2.125" | 53.98 | 0.083" | 0.070" | 0.058" |
| 2-1/2" | 2.625" | 66.68 | 0.095" | 0.080" | 0.065" |
| 3" | 3.125" | 79.38 | 0.109" | 0.090" | 0.072" |
| 4" | 4.125" | 104.78 | 0.134" | 0.110" | 0.095" |

PEX tubing

PEX (cross-linked polyethylene) tubing uses the **same OD as copper tubing** (NOT NPS). A "1/2" PEX" has an OD of 5/8", matching 1/2" copper. This is intentional: PEX fittings can adapt to copper fittings via standard transitions. There are two PEX wall-thickness specs — SDR-9 (most common, 200 psi rating at room temperature) and SDR-11 (lighter, lower rated).

| NOMINAL | OD (IN) | OD (MM) | SDR-9 WALL | ID (SDR-9) | COMMON USE |
|---------|---------|---------|------------|------------|-----------------------|
| 1/4" | 0.375" | 9.52 | 0.042" | 0.292" | Specialty |
| 3/8" | 0.500" | 12.70 | 0.056" | 0.389" | Single fixture supply |
| 1/2" | 0.625" | 15.88 | 0.070" | 0.485" | Most common branch |
| 5/8" | 0.750" | 19.05 | 0.083" | 0.584" | Manifold home runs |
| 3/4" | 0.875" | 22.23 | 0.097" | 0.681" | Main lines, hydronic |
| 1" | 1.125" | 28.58 | 0.125" | 0.875" | Main runs |
| 1-1/4" | 1.375" | 34.93 | 0.153" | 1.069" | Larger commercial |
| 1-1/2" | 1.625" | 41.28 | 0.181" | 1.263" | Commercial |
| 2" | 2.125" | 53.98 | 0.236" | 1.653" | Commercial |

Common questions

Why is a '1-inch pipe' not 1 inch in diameter?

Nominal Pipe Size (NPS) is historically named for the bore (inside) diameter, but with modern wall thicknesses, the actual ID and OD are both different from the NPS number. A '1-inch' NPS Schedule 40 pipe has a 1.315" OD and 1.049" ID. The name is a label, not a measurement. NPS 12 and above name the OD instead.

What's the difference between Schedule 40 and Schedule 80?

Schedule numbers indicate wall thickness — higher = thicker walls = more pressure capacity but smaller inside diameter. Schedule 40 is the standard for most water and DWV applications. Schedule 80 is used for high-pressure or industrial applications. For 1" NPS: Sch 40 wall = 0.133", Sch 80 = 0.179".

Can I thread Schedule 40 PVC pipe?

Yes for low-pressure applications (typically under 100 psi at room temperature), but threading reduces wall thickness and pressure capacity by about 50%. For threaded PVC, derate by 2× and verify the application allows threaded joints. For higher pressure or critical service, use solvent-welded socket joints instead.

What does 'DN' mean on European pipe specs?

DN (Diameter Nominal) is the European equivalent of NPS, sized in mm. DN 25 corresponds to NPS 1, DN 50 to NPS 2, etc. The actual dimensions are very close but not identical — close enough that pipe fittings often interchange but threaded connections may not. Always verify when mixing systems.

How do I figure out what schedule my existing pipe is?

Measure the OD precisely (calipers required — pipe markings often fade) and compare to the NPS chart. Then measure the wall thickness or ID, and back-calculate. For galvanized or threaded pipe, the OD is the most

reliable indicator. If the OD doesn't match standard NPS, it might be metric DN — check those tables too.

Sources

- **Dimensions:** ASME B36.10M — Welded and Seamless Wrought Steel Pipe.
- **Stainless variant:** ASME B36.19M — Stainless Steel Pipe.
- **Plastic pipe (PVC, etc.):** ASTM D1785, F441 — same OD as steel by NPS; wall thickness differs.

Disclaimer. For pressure-rated work, always verify the schedule, material, and joining method against the applicable code (ASME B31.1, B31.3, IPC, UPC, etc.).